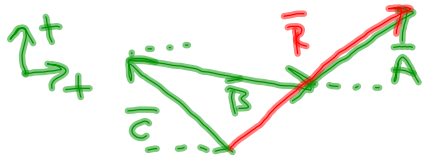
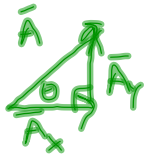
Vector Problem Types:

1. Resultant/Components
2. Hanging Objects
3. River
4. Rope pulling object on horizontal surface
5. Incline plane

Add the following vectors graphically and algebraically: 10 N at 34 degrees North of East, 15 N at 17 degrees South of East, and 12 N at 55 degrees North of West.





$A_x = (10\,N)\cos(34°)$

$B_x = (15N)\cos(17°)$

$+C_x = -(12N)\cos(55°)$

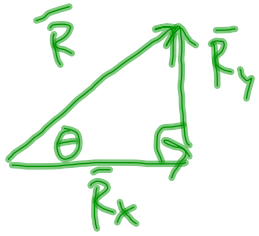
$R_x = 15.8\,N$

$A_y = (10\,N)\sin(34°)$

$B_y = -(15N)\sin(17°)$

$+C_y = (12N)\sin(55°)$

$R_y = 11.0\,N$



$R^2 = R_x^2 + R_y^2$

$R = 19.2\,N$

magnitude unit @ angle direction

19.2 N @ 35° North of East

$\tan\theta = \frac{R_y}{R_x}$

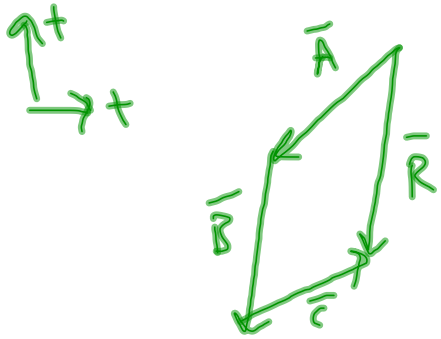
$\theta = \tan^{-1}\left(\frac{R_y}{R_x}\right)$

$= 35°$

Vector Notes and Practice Problems 4th Block 9.29.11

Add the following vectors graphically and algebraically: 44 N at 34 degrees South of West, 50 N at 81 degrees South of West, and 40 N at 10 degrees North of East.

$\vec{A}$ $\vec{B}$ $\vec{C}$

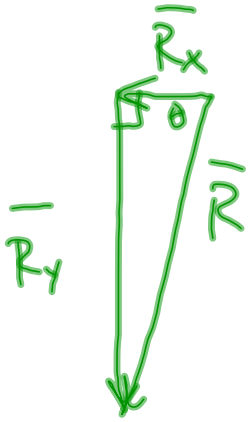


$A_x = -(44\,N)\cos(34°)$ $A_y = -(44\,N)\sin(34°)$

$B_x = -(50\,N)\cos(81°)$ $B_y = -(50\,N)\sin(81°)$

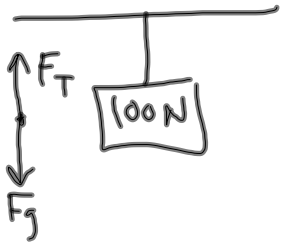
$+C_x = (40\,N)\cos(10°)$ $+C_y = (40\,N)\sin(10°)$

$R_x = -4.91\,N$ $R_y = -67.04\,N$

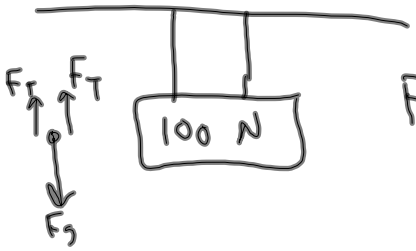


$\vec{R} = 67.2\,N\ @\ 85.8°$ South of West

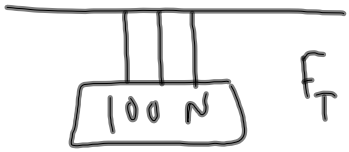
Hanging Objects:



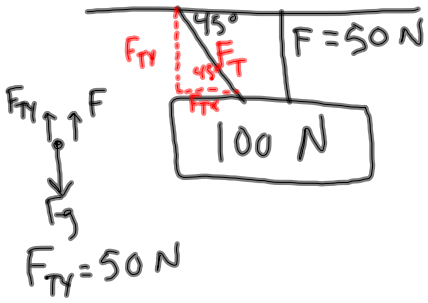
$F_T = 100\ N$



F_T of each = 50 N



F_T on each = 33.3 N



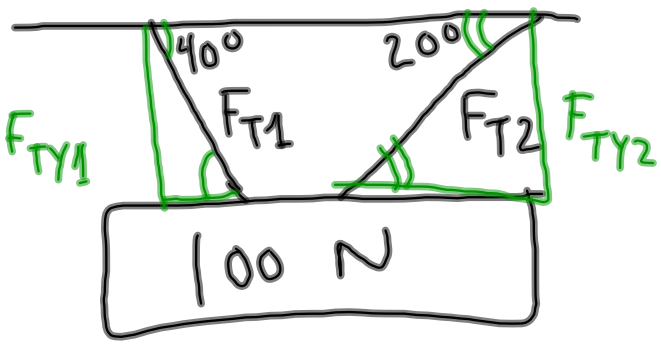
$F_{TY} = 50\ N$

$$\sin(45°) = \frac{F_{TY}}{F_T}$$

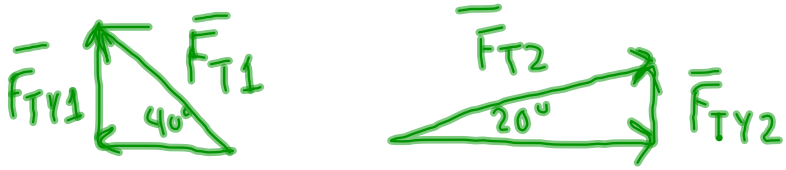
$$F_T = \frac{F_{TY}}{\sin(45°)}$$

$$= 70.7\ N$$

- Weight of hanging object is evenly distributed to all vertical components (in our problems)



Calculate F_{T1}, F_{T2}



$F_{TY1} = 50\,N$

$F_{TY2} = 50\,N$

$F_{T1} = \frac{50\,N}{\sin(40°)}$

$= 77.8\,N$

$F_{T2} = \frac{50\,N}{\sin(20°)}$

$= 146\,N$